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TI Vitreoscilla hemoglobin - Intracellular localization and binding to membranes
AU Ramandeep; Hwang K W; Raje M; Kim K J; Stark B C; Dikshit K L; Webster D A (Reprint)
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CYA India; USA
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ABSTRACT IS AVAILABLE IN THE ALL AND IALL FORMATS
AB The obligate aerobic bacterium, Vitreoscilla, synthesizes elevated quantities of a homodimeric hemoglobin (VHb) under hypoxic growth conditions. Expression of VHb in heterologous hosts often enhances growth and product formation. A role in facilitating oxygen transfer to the respiratory membranes is one explanation of its cellular function. Immunogold labeling of VHb in both Vitreoscilla and recombinant Escherichia coli bearing the VHb gene clearly indicated that VHb has a cytoplasmic (not periplasmic) localization and is concentrated near the periphery of the cytosolic face of the cell membrane. OmpA signal-peptide VHb fusions were transported into the periplasm in E. coli, but this did not confer any additional growth advantage. The interaction of VHb with respiratory membranes was also studied. The K-d values for the binding of VHb to Vitreoscilla and E. coli cell membranes were similar to 5-6 μM, a 4-8-fold higher affinity than those of horse myoglobin and hemoglobin for these same membranes. VHb stimulated the ubiquinol-1 oxidase activity of inverted Vitreoscilla membranes by 68%. The inclusion of Vitreoscilla cytochrome bo in proteoliposomes led to 2.4- and 8-fold increases in VHb binding affinity and binding site number, respectively, relative to control liposomes, suggesting a direct interaction between VHb and cytochrome bo.
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STP KeyWords Plus (R): RECOMBINANT ESCHERICHIA-COLI; DIMERIC BACTERIAL HEMOGLOBIN; GLOBIN GENE; PRIMARY SEQUENCE; OXYGEN; EXPRESSION; FLAVOHEMOGLOBIN; CYTOCHROME; IMPROVES; CLONING

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